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ABSTRACT

This report presents a description and evaluation of the MacMagic Program, a computer-facilitated core program in language arts and social studies in its fourth year of operation at Davidson Middle School in San Rafael, California. The program consists of two sixth- and two seventh-grade classrooms that use computers and cooperative learning techniques to enhance learning. The evaluation of the MacMagic Program sought, among other objectives, to assess the program's utility as a vehicle to enhance the learning of English as a Second Language (ESL) among the program's multilingual students. The evaluation consisted of classroom observations, administration of the Language Assessment Scale test to students, and comparisons of 22 ESL MacMagic students with 22 similar students in the regular ESL program at the school. Overall, it found that students expressed positive opinions about the MacMagic program and enjoyed working with computers. Comparisons between MacMagic and regular ESL students found no significant differences in test scores, absenteeism, and English language proficiency. The amount of social interaction between ESL students and native English speakers was higher in the MacMagic Program than in the regular ESL program. Recommendations for program improvement are presented. (Contains 102 references.)
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The MacMagic Program and Its Effects on "English as a Second Language" Students

November 1993

An Evaluation Study Funded by

The Marin Community Foundation

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The MacMagic Program and Its Effects on "English as a Second Language" Students

November 1993

Mi J. Kim, Principal Investigator

University of San Francisco

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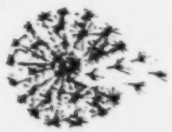

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Dr. Colin Sacks conducted statistical analysis and contributed to Chapter VII. Dr. Carolyn Horan reviewed and revised the original document. Additional editing was provided by Matthew Stafford.

Purpose and Organization

The purpose of this evaluation is to describe the implementation of the MacMagic program at Davidson Middle School in the San Rafael City Schools District and to assess its impact on ESL students' English language proficiency during the 1992-'93 school year.

Chapter I provides an introduction to the study. Chapter II describes the MacMagic classes. Chapter III describes the ESL classes (ELAC and Sheltered classes). Chapter IV describes the study's evaluation methodology, including its design, procedures, data collection process, and the instruments used. Chapter V describes the ESL students' perceptions of the MacMagic classes. Chapter VI discusses the student/teacher interactions in MacMagic and regular ESL classes. Chapter VII covers the results of quantitative analyses of Language Assessment Scale test data. Finally, Chapter VIII offers conclusions and comments.

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Chapter I

Introduction

Chapter I: Introduction

The information age has revolutionized the way people live, think, interact and learn. In today's schools, computers are considered a vital part of education. Accordingly, numerous educational programs nationwide are incorporating technology into the curricula. As a growing number of computers find their way into our schools, a series of fundamental questions regarding their role and effectiveness have been raised.

There have been several studies dealing with the effect computers have on native English speakers' academic achievement (Dunkel, 1990). Yet only a few studies have been conducted to investigate the effect of computers on ESL students and their English acquisition and academic achievement. A series of questions on this topic was formulated by Dunkel to promote further study.

- Which kinds of computer-based lessons augment the development of particular English-as-a-second-language skills (e.g., reading and listening comprehension, oral proficiency, knowledge of grammar)?
- Which kinds of computer environments (computer-assisted instruction; computer-managed instruction; computer-enriched instruction) augment the use and learning of English as a second language?
- Do students regard computer use as beneficial in improving their English language skills?
- Does small group work at a computer terminal generate conversational interactions among group participants? If so, what in particular is discussed? What is the quality of the discussion?
- Do certain features in the design of Computer-assisted Instruction (CAI)/Computer-assisted Language Learning (CALL) courseware (e.g., focus of control, screen composition) affect the quantity and quality of student learning?
- Can computerized-adaptive testing be used effectively and efficiently to assess reading and listening comprehension in ESL?
- Does the writing of Limited English Proficient (LEP) students improve as a result of learning and using word processing in English?

- What types of CAI programs should be incorporated into the curriculum for LEP students? Should instructional CAI programs (e.g., tutorials, drill-and-practice, holistic practice, modeling, adventure reading) be used? Should collaborative CALL programs (e.g., simulations and games, annotation, modeling, and discovery programs) be used? Should facultative CALL programs (e.g., word and idea processing programs with spell check and on-line thesauruses) be used by older LEP students?

These are just a few of the unanswered questions concerning the effectiveness of educational technology and ESL instruction.

Today's classrooms increasingly reflect our multicultural, multilingual society. The number of students whose first language is not English is increasing rapidly, and teachers of bilingual education and ESL students have been searching for more effective ways to teach their students. What impact do computers have on multicultural, multilingual classrooms and students?

This study examines a computer facilitated core program in language arts and social studies and its potential as an English-acquisition tool for the program's ESL students. The program, using computers as an integral learning tool, is called MacMagic and is in its fourth year at Davidson Middle School in San Rafael, California. MacMagic has a student body of high, middle, and low achieving students as well as multicultural, multilingual students in grades 6 and 7. The students are encouraged to work cooperatively on projects and to assess one another's work critically. This program provides a unique opportunity to examine the students and their progress in second language acquisition in the context of a technologically-based, multicultural classroom.

Chapter II

Desccription of MacMagic Classes

Chapter II:
Description of MacMagic Classes

The computer-based core program, MacMagic, started as a joint partnership project of the Marin Community Foundation, LucasFilm, Apple Computer, and the San Rafael City Schools. The program consists of two sixth and two seventh grade core classes at Davidson Middle School. The program follows the California State Curriculum Framework for social studies and language arts and is similar to the other sixth and seventh grade core classes at Davidson. However, in the MacMagic classes, technology is a component of the curriculum, and it is used as an instructional tool for learning other skills. The objective of the class is to facilitate the students' learning through technology and cooperative learning.

The program is located in two adjacent classrooms in a building isolated from the main school. One of the rooms contains a well-equipped Macintosh computer lab with such technologies as video editing machines, scanners, laser discs and CD ROMs. The second room is a standard classroom used for traditional class activities, group activities and discussions. Each classroom has two teachers, and there's one full-time technical support person in the computer room.

The 1992-'93 school year was the fourth year of the program. Students in the MacMagic program are selected to represent different learning abilities, cultural and ethnic backgrounds, and those whose first language is not English. The sixth grade MacMagic classes have 56 students, 10 of whom are ESL students. The seventh grade classes have 56 students; 15 are ESL students. These numbers reflect the overall percentage of ESL students in the middle school. Student selection was based on a formula designed to represent all segments of the Davidson School population and was administered by the school counselor and principal.

The objective of the MacMagic program is to develop an innovative approach to teaching English and social studies, in which the teacher is viewed as a facilitator, rather than as a dispenser of information. The key element of this program is the integration of the computer to promote cooperative learning among students of diverse backgrounds. The students are constantly involved in group projects and are encouraged to participate in group activities.

The computer-based core program is methodologically different from the traditional classroom, and the teacher-facilitator devotes a great deal of effort and time to preparing and designing the curricula.

> Teacher planning and cooperation provide the foundation for a program based on two apparently discrepant yet complementary principles: heterogeneity and teamwork. Guiding diverse groups of children to share and

> collaborate in a challenging academic setting requires thoughtful attention to process. Accordingly, MacMagic Program meets daily to outline, develop and review the content of instructional activities and to select among procedures that will engage students in an innovative learning task. (Mergendoller, 1991)

To ensure that all students would receive equal access to the curriculum, the teaching staff developed a framework that:

- identified and specified the elements of the core curriculum;
- adapted the curriculum to reflect the teaching philosophy of the MacMagic program;
- modified lessons to meet the needs of individual students;
- used technology to support individual students in their study of the core curriculum;
- used technology as the basis of writing, illustrating, and integrating language arts and social studies; and
- used technology as part of the learning process, not as a separate skill.

MacMagic classes use three basic software packages: MacWrite, MacPaint, and HyperCard.

Staff Description

The teachers and the technical support person are crucial components of the program. Each MacMagic class has two teachers who collaborate as a team. "Team teaching" often consists of dividing up the responsibilities or tasks. For example, one teacher might take charge of class discussions on readings while the other would be the "main" teacher in the computer room. These responsibilities switch back and forth. Sometimes, while one teacher is talking to the class, the other participates as a non-teaching partner, bringing up important points during the lecture, answering individual students' questions, or keeping a watchful eye on the students' behaviors.

Besides the two teachers, at the sixth and seventh grade levels there is a technical support person who assists with the computer hardware and software. The technical support person also teaches such skills as how to create HyperCard stacks, buttons, fields with visual aids, flow-charts for the bio-stacks, and other computer-oriented subjects. She attends to students' individual needs whenever they have questions. The teachers and the technical support person work together, sharing their ideas and expertise through daily and weekly

meetings. The classes also utilize eighth grade teaching assistants from last year's MacMagic classes.

Classroom Description

The classes meet daily throughout the school year during three period blocks. The time the students spend in the MacMagic class each day is 2 hours and 25 minutes. Classroom activities revolve around reading, writing and social studies (e.g., world civilizations).

The students usually sit in groups of four or five. The seating arrangement is changed four or five times over the course of the year by the teachers. The students work as cooperative units, with group assignments, projects, or presentations. The teachers consider the students' learning abilities as well as their language proficiency and social skills when assigning them to a group to encourage cooperative learning. Students are encouraged to take an active role in their own learning, to contribute to the group, and to help other group members. Frequently, the students are given assignments which involve decisions on organization, division of tasks among the members, and decisions on the presentation methods and styles.

In the MacMagic Lab the students choose their seat/computer as they please, sitting next to whomever they choose. The students make independent decisions about involvement or interaction with others in the lab. Each student has access to a Macintosh computer.

At the beginning of each class, the teacher goes over the students' schedule for the day, outlining what's expected to be finished by what deadline. Before the students begin their activities, the teacher explains in detail the assignment or activity, making sure that everyone understands it. Writing is an essential part of MacMagic. With computers accessible to every student, all writing activities go through word-processing. Almost every assignment and activity involves writing at some point.

The program employs portfolio assessment techniques which include processes as well as products. There is no formal testing or quiz on the subject matter, with the exception of a weekly "word bank" test on the vocabulary. The students are graded on their homework, class assignments, group presentations, and individual presentations. They also submit work in progress on designated due dates. Students are evaluated by the quality of their computer work and by completed reports prepared with the word processing software.

Chapter III

The Transitional English Classes: ELAC and Sheltered English Core Classes

Chapter III:
The Transitional English Classes: ELAC and Sheltered English Core Classes

(Sheltered Core Instruction is in English and Social Studies)

The comparison group students who participated in this study were enrolled in transitional English as Second Language (ESL) classes. There are three types of ESL classes at Davidson Middle School, ELAC 1 (English Language Acquisition Class 1), ELAC 2, and Sheltered English. ELAC 1 is for beginning ESL students who usually have been in this country for less than one year. ELAC 2 is for more advanced students. The Sheltered English Core class is for students who are more advanced but not quite ready for "mainstreaming." The focus is on subject matter content in English and in social studies. The ESL students enrolled in MacMagic would have been assigned to one of these ESL core classes if their names had not been selected randomly for MacMagic classes.

The comparison group students in the study come from four different ESL classes: one seventh grade ELAC 2 class, one seventh grade Sheltered English Core class, one sixth grade ELAC 2 class, and one sixth grade Sheltered English Core class. The sixth and seventh grade ELAC 2 classes meet daily for three periods. The sixth and seventh grade Sheltered English Core classes meet for two periods. There were at least 20 students enrolled in each ESL class during the 1992-'93 school year. Most classes have over 30 students. The students are predominantly Spanish speaking, but there are also students who speak Spanish, Hindu, Akkan (an African language), French Creole, Vietnamese, Chinese, and other languages.

The curricula for all of the ESL classes follow the California State Curriculum Frameworks. The instruction and the content is presented in a "sheltered" version incorporating frequent questions and answers that provide students with various examples and using different comprehensive strategies. Through this simultaneous exposure to content area instruction and English, the students work toward acquiring sufficient subject content and English language skills to be mainstreamed into the regular non-ESL classes at the school.

Staff Description

There is one teacher and one instructional assistant assigned to each class, with the exception of the seventh grade Sheltered English Core class, which has an instructional assistant for only one period. While the teachers have the main instruction responsibilities, the assistants help the teachers with individual student tutoring, class management, evaluation of students' work, and in some cases conducting content instruction. The role of the instructional assistants varies from class to class according to the teaching and class management style. The teacher and instructional assistant usually work as a team.

In some classrooms, teachers have students from more than one grade level and with different abilities and different language proficiency levels. The ESL teachers are frequently sources of information and support in helping students adjust to life in a new country. They also play the role of counselor and coach, giving attention to students who may be going through a difficult socio-economic, linguistic, cultural, or family situation. Teachers and instructional assistants provide students with individual attention during class, during lunch period, and after school whenever possible.

Class Description

The classes meet daily over the entire school year during three period blocks (two periods for the seventh grade Sheltered English Core class). The time students spend in a three-period block class is 2 hours and 25 minutes. Classroom activities revolve around language arts and social studies. The most important aspect of the class is the instruction of English as a second language.

There is one Macintosh Classic computer in each of two ESL classrooms, as well as an overhead projector used for class instruction. ESL teachers use different instructional styles, methods and approaches. For example, in one class the students sit in groups of three or four, while in another class the students sit in rows in teacher-assigned seats, which remain unchanged throughout the year.

In classes where the students sit in groups, they often work as cooperative units on group assignments, projects, activities and frequent decision-making discussions. There is frequent interaction between the students, the teacher and the instructional assistant. Few behavior or discipline problems have been observed in the classes employing cooperative learning groups. In classes where students are seated in traditional classroom rows, the teachers go over the instructional materials and students are expected to work on assignments individually. Verbal and non-verbal interactions are not encouraged. However, it's second nature for students to ask someone nearby to explain an unclear instruction. In many cases, the students move around during the class to talk with someone across the room. Much of the class time is spent on control of the students' talking, physical activities and movements.

In both types of ESL classes, the teachers employ Sheltered instruction techniques, involving frequent questions and answers to allow students and teachers to negotiate the meaning of words and concepts in English. By repeating key words and phrases and through slow speech, the use of controlled vocabulary and expressions, the use of visual aids and an extensive use of body language, the teachers provide a variety of opportunities for students to learn the material.

As noted above, class management styles are different from one teacher to another. Regardless of approach, the atmosphere is non-threatening and supportive. Students are encouraged to express themselves in English and teachers do not necessarily correct every

mistake the students make. Corrections are kept at a minimum as long as the mistakes do not interfere with communication itself.

Typically, the teacher first introduces students to a literature piece, focusing on vocabulary. The teacher leads the students in a discussion of the topic. Then individual or group assignments are given related to the topic. In addition to language acquisition, the ESL class also spends time on the instruction of English grammar and basic vocabulary studies. The students have regular assignments and tests on the grammar and vocabulary that they learn each week.

The students in the ESL classes have the same projects as other non-ESL language arts and social studies core classes, such as a Greek project, an Egyptian project, a report on a country for the sixth graders, and research reports and other projects for the seventh grade. Besides the special projects, the students have regular assignments and homework on reading, writing, spelling, grammar and vocabulary.

Chapter IV

Evaluation Methodology

Chapter IV: Evaluation Methodology

Student Demographics

All the non-English or limited English speaking students in the MacMagic classes and a matched group of students from the regular ESL classes were selected to be part of this study. In the following section, the student demographics information is presented on three tables. Table 4.1 illustrates Class Composition of the MacMagic Program, the number of ESL students in the MacMagic Program and the number of ESL students who were in a regular ESL program. Table 4.2 identifies the number of students who are considered either ELAC or Sheltered (*) students in both MacMagic and in the regular ESL program at Davidson. Tables 4.3 and 4.4 illustrate the Native Language Background, Sixth and Seventh Grades respectively, for the study group (MacMagic students) and the comparison group (regular ESL program students).

Table 4.1: Class Composition (Gender/Grade)

Group	Sixth		Seventh	
MacMagic Program	Total	59	Total	56
(Total # of Students)	Boys	27	Boys	27
	Girls	32	Girls	29
MacMagic ESL	Total	7	Total	15
(Study Group)	Boys	3	Boys	9
	Girls	4	Girls	6
Non-MacMagic ESL	Total	9	Total	17
(Comparison Group)	Boys	5	Boys	11
	Girls	4	Girls	6

* Sheltered students are designated limited English proficient and are preparing to enter regular education classrooms.

Table 4.2: English Proficiency Level

Group	Eng. Proficiency	Sixth	Eng. Proficiency	Seventh
MacMagic	ELAC II	5	ELAC II	1
(Study Group)	Sheltered	2	Sheltered	14
	Total	7	Total	15
ESL	ELAC II	6	ELAC II	3
(Comparison Group)	Sheltered	3	Sheltered	14
	Total	9	Total	17

ELAC: English Language Acquisition Class

Table 4.3: Native Language Background, Sixth Grade

Study Group		Comparison Group	
Spanish	6	Spanish	7
Vietnamese	1	Vietnamese	1
Chinese	0	Akkan	1
Total	7	Total	9

Table 4.4: Native Language Background, Seventh Grade

Study Group		Comparison Group	
Spanish	8	Spanish	15
Vietnamese	2	Vietnamese	0
Chinese	1	French Creole	1
French Creole	2	Persian	1
Turkish	1		
Polish	1		
Total	15	Total	17

Evaluation Design

Teachers and students were observed on a regular basis at least twice a week in order to assess the students' language interactions and behaviors in the computer-based class over the course of one school year. Qualitative data were also collected from taped and untaped interviews with the teaching staff and students. The purpose of the observations in MacMagic classes and the comparison ESL classes was to monitor students' language interaction among themselves and with the teachers, and to document the language progress of the ESL students. The observations occurred mainly in the MacMagic classes.

The Language Assessment Scale (LAS) test, administered before and after the class, provided individual scores for oral language and writing. The test was administered in late September and late May to the study group (MacMagic classes) and the comparison group (ESL: ELAC/Sheltered classes). At the same time taped interviews and writing samples from the students were gathered.

Permission letters were sent to the students' parents or guardians, and only those students who had approval were included in the study.

Student Population

Ten sixth grade and 15 seventh grade MacMagic students were in the study group. An equal number of students was selected for the matching comparison group.

The ESL students in the MacMagic classes were randomly selected from a list of students at the end of the 1991-'92 school year. The comparison group was selected from approximately 100 sixth and seventh grade ESL students in the school. (Forty-six students in the sixth grade were classified as LEP/NEP students. Eight of them were in the MacMagic classes. Fifty-four students in seventh grade were classified as LEP/NEP students, and 15 of them were involved in the MacMagic classes.) With the cooperation of the teachers and school counselor, 26 students were matched to the MacMagic students to make up the comparison group.

In the process of selecting the students for the comparison group, the following criteria were applied as closely as possible. Students were matched for:

- grade level and age;
- academic performance level as identified in IPT (IDEA Oral Language Proficiency Test) and LAS (Language Assessment Scale) scores;
- English proficiency level;
- gender;

- native language background; and
- teacher perception.

Due to the lack of adequate background information on the students, it was difficult to apply all of the above criteria in every case. While the teachers' input was the most valuable criterion, grade average, attendance record, and relevant academic history in the students' files was used in deciding which students would form the comparison group. It was not possible to find a perfect match because of the small number of students in the available pool. As a group, the ESL students in MacMagic had a higher language proficiency than the ESL students in the comparison group.

Data Collection Process

Data were collected throughout the 1992-'93 academic year. Non-participant and participant observations and interviews were used to obtain an accurate description of the classes. The focus of the observation was the language interaction between the students and the teachers and among the students themselves. The students' computer interaction was also observed. Pre- and post-tests on English language proficiency were given using the Language Assessment Scale (LAS) Oral and Reading/Writing.

Interviews

Taped and informal interviews were conducted during the regular classes of the MacMagic program. Participant and non-participant conversations and dialogues were employed to gather data on the ESL students' perceptions of the class, attitudes about using computers, and students' own interpretations of their interactions with others. Informal student interviews offered much data on student interaction, use of language, and cultural perceptions.

Informal interviews with teachers in the MacMagic and ESL classes were conducted in the form of "lunch room chatting" and "sharing ideas." This provided a greater understanding of the teachers' perceptions of the classes and their dynamics.

Most of the interviews were conducted in English. A few with students, who weren't able to express their ideas in English adequately, were helped in interpretation by students who spoke the same language. Since Spanish was the predominant first language among the ESL students, a Spanish speaking teaching assistant provided additional interpretation for those interviews. This helped to reduce the student's interview-related stress.

The taped interviews were transcribed and the major themes were identified. The informal interviews were jotted down as part of the observation field notes, which were transcribed later.

Observation

Classes were observed throughout the school year. The frequent classroom presence of the observer (one to three times per week) reduced the problem of student reactivity. The open, flexible nature of the MacMagic classes was another asset: Many people, including teachers, technical support personnel, and the students themselves, frequently walked in and out of the classrooms, and there were many observers from other schools, the district, or community organizations. For that reason, the students and the teachers were accustomed to having visitors in their classes.

Observations concentrated on class dynamics and on the natural interactions, reactions, and progress of the ESL students. One focus was the students' language interactions, especially the interaction between the ESL students and the teacher, the ESL students and other native students, and among ESL students themselves, as well as the students' interaction with the computer. Notes were taken throughout the observation and were later reviewed and their major themes identified.

Student Assessment Instrument

The state-approved Language Assessment Scale (LAS) was used in this study to assess all ESL students in both the computer-based core classes and the ESL core classes. The selection of the LAS was based on consideration of validity, reliability, cost, and ease of administration.

LAS-Oral: Forms 1C/1D, 2C/2D:

Language Assessment Scale-Oral assesses the students' oral language skills. Forms 1C and 1D are used for sixth graders and Forms 2C and 2D are used with seventh graders. The LAS-O contains three sections: Vocabulary, Listening Comprehension, and Story Retelling. The LAS-O is usually used to test students' oral English proficiency level for placement purposes.

Forms 1C and 2C were used for the pre-test and Forms 1D and 2D were used as the post-test. As noted, the LAS-O has three sub-components: Vocabulary, Listening Comprehension, and Story Retelling.

The Vocabulary Section tests the student's ability to produce words to go with the pictures shown by the test administrator. Forms 1C and 1D have two sub-sections under the Vocabulary section. The "Name that Picture" section tests the student's ability to produce labels for objects in the picture shown, and the "Action Words" section tests the student's ability to come up with the action verbs shown in the picture. Forms 2C and 2D also have two sub-sections, "Action Words" and "Opposite Words." In the "Opposite Words" section, the student's ability to produce an antonym to a given word is tested.

The Listening Comprehension Section measures the student's listening comprehension ability. The student listens to a taped conversation while looking at the cue pictures provided. Afterwards, the student responds to a series of true-false questions.

The Story Retelling Section gathers oral language samples of students so their oral language proficiency can be holistically rated. The student listens to a taped story while looking at the provided cue picture book. Afterward, the student is asked to retell the story in his or her own words. The examiner writes down the student's response while recording it on tape. The complete response is transcribed. Later, the "Story Retelling" section is rated according the guidelines provided by the LAS manual. The scores are rated holistically on a scale of 0 to 5 by two or more raters. The "Story Retelling" section is the biggest part of the LAS-O score.

LAS-Reading/Writing Form 2A/2B, 3A/3B

The LAS-Reading and Writing assesses the student's ability in these areas. The LAS-Reading/Writing has two forms, A and B for each level. Forms 2A and 2B are used with the sixth grade, Forms 3A and 3B with the seventh grade. Forms 2A and 3A are used as the pre-test while Forms 2B and 3B are used as the post-test.

The LAS-R/W level 2 has seven sections, including Vocabulary, Mechanics and Usage, Fluency, Reading for Information, Finishing Sentences, What's Happening? and Let's Write. The LAS-R/W level 3 has seven sections as well: Synonyms, Fluency, Antonyms, Mechanics and Usage, Reading for Information, What's Happening?, and Let's Write.

Vocabulary measures the student's ability to match pictures to words at levels 1 and 2.

Synonyms measures the student's ability to identify words with similar meanings at level 3.

Antonyms measures the student's ability to identify words of opposite meanings at level 3.

Fluency measures the student's overall language fluency and the ability to infer a missing word based on knowledge of language usage and semantics. Items of appropriate difficulty are included at all three test levels.

Mechanics and Usage measures the student's skills in capitalization, punctuation, and grammar usage at all three test levels.

Reading of Information measures the student's ability to gather information from written material. Each level contains one story and 10 test items, which at level 1 are true-false questions, and at levels 2 and 3 are multiple choice.

Finishing Sentences measures the student's ability to complete a sentence correctly with five open-ended test items at levels 1 and 2.

What's Happening? measures the student's ability to write an original sentence. At each of the three levels, it includes five graphic prompts; the student writes a sentence about each one. There is a three-step procedure for scoring the "What's Happening?" section as given in the LAS Scoring and Interpretation Manual.

Let's Write measures the student's ability to write a story. Level 2 uses a graphic prompt, and level 3 uses a verbal prompt. There's a scoring guide for the "What's Happening?" section as given in the LAS Scoring and Interpretation Manual.

Oral Language Sample

The Story-Retelling section from both the pre-test and post-test of the LAS-O was separately evaluated. More detailed holistic rating of the speech sample was performed according to the provided Oral Language Sample rating system on the scales of 0 to 5 with a plus in each level (0, 1, 1+, 2, 2+, 3, 3+, 4, 4+, 5). The LAS scoring system has a scale of 0 to 5, but with the LAS scoring system, the majority of the students tend to fall under the rating of 3, since 3 is the middle rating. There are very few ratings of 4, 5, or 0, 1.

The length of the oral speech sample in the pre-test and post-test was examined to determine any gains in terms of length.

Writing Sample From LAS-R/W "Let's Write" Section

Writing samples gathered as part of the LAS pre/post test were separately analyzed with a more detailed rating system to measure the fluency in written language more closely, independent of other LAS Reading/Writing section scores. The length of the writing samples was also examined to investigate the overall gains in terms of the quantity of writing.

Items Included in the Evaluation

The following questions formed the basis for data collection:

1. How do ESL students perceive the MacMagic class?

2. How do the ESL students interact with teachers, native speaker students, and among themselves in the MacMagic class?

3. What do the ESL students do in the MacMagic class?

4. How much gain will the MacMagic ESL students achieve by the end of the school year as measured by the Language Assessment Scale (LAS)?

    a. How much gain will be achieved on the general LAS scores?

    b. How much gain will be achieved on the fluency of the writing samples from the LAS in terms of holistic scoring and average length?

    c. How much gain will be achieved on the fluency of the oral language sample from the LAS in terms of holistic scoring and average length?

5. What gains will the non-MacMagic ESL students achieve by the end of the school year as measured by the LAS?

    a. How much gain will be achieved on the general LAS scores?

    b. How much gain will be achieved on the fluency of the writing samples from the LAS in terms of holistic scoring and average length?

    c. How much gain will be achieved on the fluency of the oral language sample from the LAS in terms of holistic scoring and average length?

6. Are there any differences in English language proficiency achievement scores at the end of the school year between the MacMagic ESL students and non-MacMagic ESL students from other ESL core classes?

7. Is there any difference in attendance between the MacMagic ESL students and non-MacMagic ESL students?

In order to answer questions one through three, notes from observations and interviews were reviewed to bring out common themes.

To answer questions 4 through 6 the general overall scores of the ESL students' pre-test and post-test were compared to determine any gains. The holistic scores of the writing and oral language samples from the pre- and post-test "Let's Write" and "Story Retelling"

sections were compared. Also, the average length of the writing samples and the oral language samples were examined to determine any gains in length.

To answer question 7, the student attendance records were obtained, and the mean reported absence of the ESL students in the MacMagic classes and the ESL core classes were compared.

Calendar of Events in Carrying Out the Study

Both the computer based core class group and the comparison ESL class group were pre-tested in September/October and post-tested in May/June. Between the pre/post-tests, the classes were closely observed at regular intervals. After the instrumentation was completed and the results from the pre-test, post-test, and writing samples were gathered, the study analysis was performed. The study Schedule is presented in Table 4.5 below.

Table 4.5: Schedule

Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	|							|	
Pre-test									Post-test
Writing sample	---------->		Observation		<			----------	Writing sample

Limitations of the Study

Eight different classes were involved in this study. While the MacMagic classes had the same teachers and technical assistant, the comparison group of ESL students came from ESL classes with four different teachers and instructional assistants who had distinctive teaching styles and class management practices.

Chapter V

ESL Students' Perceptions of MacMagic Classes

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ESL Students' Perceptions of MacMagic Classes

Overview

In general, the students expressed positive opinions about MacMagic. They seemed to appreciate the free atmosphere, low stress levels, and the relaxed classroom environment. They felt that MacMagic classes placed the responsibility of learning on the students themselves. Students are in charge of their own learning processes, and each student can learn and work at his or her own pace. Teachers were seen as learning facilitators rather than knowledge dispensers.

MacMagic seemed to raise students' interactions with one another as well as the level of teacher attention each student received. Although many ESL students in MacMagic have been in the United States less than four years and lack the English proficiency to be mainstreamed, they contributed as members of their respective groups in activities with students who were native English speakers.

The ESL students had positive comments about class computer use. Each student identified computers as a unique, interesting, fun feature of MacMagic. In this chapter, MacMagic student comments are presented.

On Computers

The computer-aided benefit most mentioned by students was the ease of the editing process. Computers allow them to add or delete text and to reorder entire paragraphs or sections. Other choices available to students working with computers include type of font, graphics, sound and animation.

Sample comments from the ESL students include:

> "I think it is neat how computers function, it makes work a lot easier."
>
> "I love it, I just like working on computers. It's fun. If I make a mistake, I don't have to start all over again, it's a lot easier to correct the mistakes I make. So I get to try many different things."
>
> "I like to use HyperCard because I can create a lot of interesting and fun, really nice stacks."

"If I make a mistake on a paper, I have to rip it and start all over again. But with the computer, you just delete or correct your mistake on screen with a few keys, it's so simple. You can also use spell check to help you."

"With the computer, you can do many different things like animation with paint tools and HyperCard."

"You can learn anything you want to learn with the computers in this class."

"You don't have to write with your hands anymore. You just do everything on the computer. It's easier–it doesn't hurt your hand to write a lot."

"Because you get the printout of your work, writing, or drawing, it looks really nice. You have very nice looking prints out of your work, also it is so easy to correct the mistakes and change them."

"I like working on the computers because I can get a job working on the computers later when I grow up because I know how to use the computers."

"Computers are smart and they tell me what to do and how to think about things."

On Group Work

One of the most important features of MacMagic classrooms is the integration of curriculum and technology with the cooperative learning strategies. The student-centered group activities are enhanced by multi-media/hypermedia tools. The students work in groups of two to four. The cooperative groups change four to five times throughout the year to promote interactions among a wide range of students. Teachers recognize the positive effects on social as well as academic levels. Typical cooperative activities would involve group projects requiring social interaction, learning through discussions, questions, negotiations, compromises, and creations. Students frequently participate in peer editing and peer tutoring. The students appeared to recognize the benefits of cooperative learning groups as they repeatedly mentioned "group work" as one of the unique features of MacMagic. Sample student comments follow:

"I like working with other people because when I don't understand something, one of them always knows the answer and can help me."

"Sometimes, it's not fun working with others because some people don't work hard; they don't cooperate and the rest of us end up doing all the work for the person, it is not fair."

"We also have class meetings and I really like that because we can tell the teachers what is going on and how we feel."

"I like working with people who are smart, not with those who just fool around."

"The most interesting thing in MacMagic was computers and working with friends."

"In other classes, I have to just sit at my desk, but in this class I sit with others and we can also move around in the classroom."

On Differences Between MacMagic and Other Classes

The ESL students in MacMagic noted the following differences between MacMagic and other classes:

"We use computers [in MacMagic]. We draw and write on the computers too."

"We have less homework [in MacMagic] but more work during the class."

"In other classes, I don't have to stand in front of the class and talk. I have to in this class."

"In my science group, we also work in groups but there are many Spanish speaking people, but in this class, there are not too many."

"We stay in MacMagic for three periods while other classes have only one period."

On Learning English

The students' self-perception comments reflected the nature of the impact of MacMagic on the students' second language learning process. Eighteen out of 22 MacMagic ESL students thought their oral language skills were better than their written language. Twenty out of 22 expressed the desire to improve their writing skills. The most frequently mentioned difficulty in English was vocabulary. The ESL students have internalized the importance of vocabulary in learning English. To ESL students, knowing the meanings of words and their spellings was considered one of the most important parts of learning English. Following are some typical comments by MacMagic students.

"Sometimes, when people talk, they have some complicated words I don't understand, then I can ask someone in the class."

"This class is all about learning English and reading language. In other classes, we don't do too much reading. I get to communicate more, and get

to talk more. Sometimes, I hear a word which I don't know but I get to listen to others using the word and learn the meaning."

"This class helps me learn more words."

"I learn more English in this class than other classes because we in this class, we have word bank, the teachers make us look up the dictionary."

"[I learn some words by] Listening to what other Americans say and trying to figure what they are saying. I sometimes write them down to remember."

" The native speakers help me when I don't know some words. They tell me their meanings."

"I learn more words in this class because of the word bank. I have to know the definition and sentences for the test. I have to memorize them."

"While working on the computer like the 'ABC' stacks, we have to talk to others to find out how to do certain things or how to spell some words in Spanish. I get to speak more with others in English."

" With the spell check, I find out my mistakes in spelling."

"I don't think I learn more English in this class because in my other classes, I always speak English with everyone (except my science class)."

"I learn more English in this class because I have to talk with people, doing my work with others. Here I learn more English in this class because we only study about English."

"I ask questions to anybody if I don't understand something. I learn English by listening and talking to others. If I hear somebody speaking some new words I didn't know, I pick it up. And if I don't understand, I always walk up to the person and ask the meaning."

"I think I learn more English here, I mean words, and reading stuff. Because it's longer than other classes. We have three periods."

"You have to write a lot in this class. There are a lot of stuff to do and you have to go to the front of the class and speak."

"I think I learn to speak English in this class because the teachers and other students only speak in English. I hear English all the time."

"The teachers speak a lot in English and they make sure that I understand them."

"I talk to other students a lot in this class. That helps me with my English speaking and listening."

On Motivation and Attitude in Second Language Learning

Comments provided by ESL students suggest that they want to learn to speak English to function as members of society as well as to be able to get jobs later on. Typical comments follow:

"Learning English is important because I want to communicate with others."

"I like to be able to write better. It is hard to describe what I want to say in English yet. I want to be a good writer too."

"Sometimes, when the native speakers speak, they have some complicated words that I don't understand. I want to know every word spoken by others."

"It is very important to speak good English because if you don't speak English, you can't talk to anybody. That's really hard for you."

"There are so many words in English. I need to learn them."

"Learning English is important, because if I am learning another language. I can get a better job."

"If you don't know how to speak English, kids pick on you. So you have to know how to talk back."

"I like to read stories. I wish I could be a better reader."

"Now I live in America and I have to learn their language. Sometimes I have to talk to Americans. If I can't speak English, I can't talk with them."

"Going to school is important because I learn new things. And in order to be able to go to school and understand the teachers and others, I have to learn English."

"If you know how to speak English, you can help others who don't speak the language, my friends, my parents, and others."

"If you know two languages, you know more friends and you can have better work if you are bilingual."

On Their First Language

The ESL students also noted the importance of their [first] languages. Most of the students speak their first language at home with their parents, siblings and friends. Many students also speak their first language at school with students who speak the same language. Speaking a first language was frequently associated with students' cultural and ethnic identities, while speaking English was associated with learning and school. Sample comments follow:

"I don't speak English too much. I like to improve my English, but I don't want to forget my first language."

"I always speak in my first language when I speak to my family, relatives or other friends who know my language."

" Speaking Spanish is important because it is my language. And if I don't know how to speak Spanish I can't talk to my parents."

"Speaking Spanish is important because I am a Latino and it's my culture. [They all speak Spanish.] If I go to my country and only speak English, I wouldn't know how to speak with others. I go back to my country sometimes to visit. I wish I could go back to my country and live there."

"Both English and Spanish are important to me, because I have to know and use both languages every day."

"Speaking Vietnamese is important to me because I can understand what my mom and dad are thinking and speaking about. I can listen to them."

"I speak Polish with my family. I have to speak the language to communicate with them."

On Teachers

The MacMagic students noted the different teaching styles of MacMagic teachers. What follows are some representative comments from the students about their teachers:

"There are two teachers in this class, we only have one teacher in the other classes."

"The teachers try to help me as much as they can. They try to make things clear. They help me whenever I need their help."

"Sometimes, it's hard to get the teachers' attention, especially in the computer room. I have to wait for a long time, when they are talking to other students."

"I feel very comfortable speaking to the teachers because they let you ask any questions. They are friendly."

"The teachers are nice and they will help you. They help you and they even make jokes. They are fun."

"I always try to ask questions to the teachers rather than to other students because sometimes other students don't know what they are doing either. The teachers know the best."

"The teachers are nice."

"The teachers want you to have more fun with what you do and learn in this class."

"The teachers in MacMagic let you decide on many things when you are working on the projects, but the teachers in other classes always tell you what to do."

"The teachers don't give us a lot of homework and they know that we like to work on the computers."

"The teachers only speak in English so I hear English all the time."

"The teachers help me a lot with my homework and with spelling. If I don't understand what a word means, the teachers explain a lot to me. They also help me after school. I stay after school for two to three days per week but I don't mind. The teachers make sure that I understand all the homework."

Students' Suggestions for Improvements and Changes

The MacMagic students also offered suggestions and comments concerning ways in which MacMagic could be improved. Others felt no changes were called for.

"I wouldn't change anything about MacMagic. I wish I could be in eighth grade MacMagic just like this one next year."

"I wish there were more fun activities like a birthday celebration. I also wanted to introduce my country to other students. And others who came from other countries should do that too."

"I think they [the teachers] should ask the students what they think about the projects or ask what kind of activity we would like."

"I hope we could sit wherever we wanted."

"I hope that the teachers would tell me earlier if I was missing any work so that I could make up."

"We do the same thing like 'current events' and 'word bank' over and over again. I wish we could use computers for these activities as well."

"They have 'word bank' and 'current event,' it's O.K. for the first couple of months, but it gets boring. They should change that to something different. Most people in class don't like to do it because it's boring. They think it's the same assignment again and again."

"I wish I could play 'word bank' games on the computers rather than doing the work on paper."

"I like to spend more time on the computers than anything else."

"The teachers should keep the disks because some kids go around and delete others' work."

"I wouldn't let students sit next to his or her friends in both the computer room and the classroom because they will constantly talk and not pay attention to the teachers and don't do too much work."

"I wish this class had more people who speak my first language. Because I can ask questions in my language if I don't understand something."

"I don't like doing the reading record."

"I wish they didn't make me speak in front of the class. I get very nervous when I have to do that. I like to be able to give my report in person privately."

"I wish we could do less social studies and more language arts assignments."

Chapter VI

Student/Teacher Interactions in MacMagic and Regular ESL Classes

Chapter VI: Student/Teacher Interactions in MacMagic and Regular ESL Classes

MacMagic classes have a distinctive style. In this chapter, the general interaction patterns, especially the language interactions between students and teachers identified during year-long observations, will be discussed.

Language Interactions in MacMagic

The atmosphere in MacMagic classes is relaxed and easygoing. Students talk to each other constantly, asking questions, enjoying conversation and working with the computers. The students are not restricted to their desks and they can walk up to anyone and ask questions in the MacMagic Lab. When they're in the MacMagic classroom they're more restricted in their activities. MacMagic classroom activities consist of discussions, group or individual presentations, reading, or group activities that do not require computers and other technologies. Teachers function as facilitators and students are encouraged to gather information from each other. In the MacMagic Lab students cannot ask questions of the teachers until they have asked at least two classmates.

Once the groups of friends were established in the MacMagic Lab, seating patterns remained constant throughout the school year. The teachers and technical support person circulate around the Lab and provide assistance when a student requests help.

The ESL Students in MacMagic

There were 15 ESL students in the seventh grade and 7 ESL students in the sixth grade MacMagic classes. Out of 22 ESL students involved in this study, 14 students spoke Spanish as their first language. Other students' native languages were French Creole, Turkish, Polish, Vietnamese and Chinese. In all, there were 10 girls and 12 boys.

The seventh grade morning MacMagic class included 10 ESL students, seven of whom spoke Spanish. The ESL English language proficiency level varied from student to student. The students with higher English proficiency appeared to interact more with English speakers in the class, participating in the class discussions as well as other activities. The ESL students with low English proficiency tended to be more reclusive and withdrawn. The students who knew others who spoke their language (predominately Spanish) tended to form their own support group within the class. They sat together and worked together in the MacMagic Lab. They spoke Spanish to one another, frequently explaining the tasks, asking and answering questions. There was one boy, A, who refused to speak English for one semester and ignored any English spoken to him. Another Spanish speaking boy, B, always helped him, translating others' speech, and explaining assignments and activities. They

always sat next to each other in the MacMagic Lab and worked together. Other Spanish speaking students helped whenever they were around. In the Spanish speaking group boys and girls usually did not cross the gender line when they interacted. There were two Spanish girls who always sat together in the MacMagic Lab sharing their work, always talking in Spanish. However, they barely interacted with Spanish speaking boys.

Those who didn't understand could count on their friends to explain things in Spanish. In many instances, there was bilingual instruction occurring between ESL students who spoke the same language. When students did not know enough about a subject to teach it to their friends, they usually asked others for help. Strong ethnic solidarity among Spanish speaking students was observed.

Lone representatives of a native language tended to assimilate and interact with English speakers. At the beginning of the school year, ESL students in seventh grade classes tended to associate with each other, even though they did not share the same native languages. This might be because many of them had the same ELAC or Sheltered Core classes the year before. Perhaps they also felt more secure speaking with someone who, like themselves, did not speak English fluently. In sixth grade this phenomenon was not as strong. A form of ethnic solidarity among Spanish speaking students was observed, but the close association among all ESL students was not as apparent. This might be because they came from six different elementary schools.

In some cases, racial or ethnic factors proved to be important variables. C, a Caucasian ESL boy, used to be friendly with D, a Spanish speaking ESL student. Both of them were at the advanced proficiency level. But as time passed, C identified more with other Caucasian English speaking boys, and eventually became quite good friends with one of them. D and C were still talking occasionally, but C identified with other non-ESL students. The students from Haiti identified more with other African American students as time passed. They sat together when permitted and participated in the classroom activities together.

The native culture of the students was another important variable in student interaction. For example, Asian students were pretty much on their own, and resisted asking questions either of the teachers or of others. One boy said, "Asking is not very good, I always try to find answers by myself," and another said, "You are not supposed to ask, if you don't know something, it's your fault." "I always ask the teachers if I have to, I don't like asking others [other students]." Asian students, especially those who have been in the United States less than three or four years, tend to work by themselves if allowed. Even in the MacMagic Lab, where most students converse constantly, they have very few interactions with others. Unless they are assigned to a group activity, they always work individually.

What Do the ESL Students Talk About?

At the beginning of the school year, there was a lot of talking among the students. As the school year progressed, the observer became more interested in the content and quality of the talk. Much of the communication in the MacMagic Lab concerned peer instruction. Most of the conversations centered around "trouble shooting" sessions among the students and between the students and the teachers. Typically, the class went over the project and the methodology together as a group. A teacher, or the technical support person, explained how to do it while demonstrating with visual materials. Some of the students who understood quickly went right into the project. Others thought about the problem and then would ask "computer-smart" students for help. They gathered around this person to observe, commenting and asking questions as they watched. The "computer-smart" people became in demand. They showed their work to other students on the computer, demonstrating their skills. The others apparently learned from these, picking up complex concepts fairly easily through observation. The most frequent language interactions occurred while students worked on the computers, except when they were really concentrating. They often commented on each other's work, asking how to achieve certain effects on the screen.

At the beginning of a new project, student conversations tended to focus on the project. As time progressed and students got more familiar with the project, their conversation became more casual (anything from last night's TV program to school gossip). In other words, there was more interaction between the students at the beginning of a new project to understand the mechanics and nuts and bolts of the projects from each other. However, as the projects progressed, there was more interaction unrelated to the class activities or assignments. Most of the students didn't leave their computers since they were already sitting near their friends. These patterns held true regardless of the level of native language proficiency.

Types of Interactions

Webb (1980, 1982, 1984) employed several sets of interaction variables for analyzing small group interaction. The variables are structured with respect to types of individual verbal behavior and group responses to the behavior. The interaction variables are as follows:

- Giving an explanation
- Receiving an explanation
- Receiving a response without an explanation
- Receiving a response to a procedural question
- Giving short answers
- Receiving no response

Lee (1989) generated Peer Interaction Categories incorporating Webb's interaction variables. Her Interaction Categories are classified into four major areas of interaction: task-

related interaction, procedure-related interaction, socio-emotional interaction, and miscellaneous off-task interaction.

Lee's categories are as follows:

1) **Task-Related Interaction**
   - Gives task-related help
   - Gives inadequate task-related help
   - Asks a question and receives task-related help
   - Asks a question and receives inadequate task-related help

2) **Procedure-Related Interaction**
   - Gives procedure-related help
   - Gives inadequate procedure-related help
   - Asks a question and receives procedure-related help
   - Asks a question and receives inadequate procedure-related help

3) **Socio-Emotional Interaction**
   - Positive socio-emotional interaction
   - Negative socio-emotional interaction
   - Neutral socio-emotional interaction

4) **Miscellaneous Off-Task Interaction**

In MacMagic, all of the above interaction categories were observed. At the beginning of each project, there were more task-related and procedure-related interactions among the students. These interactions were most common while the students worked at the computers. As the project or group activities progressed, more of the socio-emotional interactions occurred. Eventually, miscellaneous off-task interactions become more common. In the MacMagic classroom, student activities were more structured than in the MacMagic Lab. Students were given specific activities to complete within a given time. The teachers frequently required everyone's attention during class instruction and during discussions. Therefore, there was less socio-emotional and off-task interaction in the MacMagic classroom.

To summarize, in most cases, and especially among students with lower English proficiency, students tend to ask questions of someone who speaks their same first language. However, due to the emphasis on group activities and peer instruction, most of the ESL students (with one or two exceptions) ultimately participated in some form of task-oriented interactions with native speakers. ESL students with high English proficiency exhibited interaction patterns similar to those of native English speaking students, with frequent interaction in all four categories.

Did the Interaction Patterns of ESL Students Change Over Time?

The ESL students' interaction patterns underwent some changes as the school year progressed. The "ethnic solidarity," "language solidarity," and "ESL group solidarity" remained intact throughout the school year. At the same time, the ESL students increased their interaction with native English speakers. Even those few students who'd originally only speak to those who shared their native language developed some interactions with native English speaking students.

The seventh grade MacMagic ESL students exhibited clear ethnic and linguistic preferences when they interacted. The sixth grade MacMagic ESL students, however, showed a higher level of interaction, regardless of ethnic or linguistic background. Towards the end of the school year, the pattern of interaction that was observed in the seventh grade students started to emerge among the sixth grade ESL students.

Each individual ESL student, whether in sixth or seventh grade, underwent some changes in terms of their interaction patterns (with one exception). Each student became more open to both verbal and non-verbal interactions. The students who were very reserved and withdrawn at the beginning of the school year changed little by little. By the end of the school year they were asking questions and starting conversations. They also responded more actively to the native English speakers' questions or comments. A very quiet Asian girl said on one occasion, "I don't like to talk to others, because I don't speak good English. I am afraid that Americans will make fun of me if I make any mistake." One boy mentioned that he does not like to speak English because "when I speak English, they don't understand me. I think my pronunciation is not too good. I don't like to repeat the same things again and again, because I feel bad. So I feel nervous when I speak English to others." By May, both of these students were engaged in verbal interactions with other students and teachers much more than at the beginning of the year.

Were There Any Individual Differences in Language Interaction?

There were several factors influencing the language interactions of the ESL students in MacMagic. The most influential variables were:

- Personality: Certain personality traits triggered greater interaction between ESL students and others, especially between the native speakers and the teachers. The personality traits included the willingness to take risks, lack of inhibition, extroversion and assertiveness. ESL students with any of these characteristics tended to interact with others more.

- Self-esteem: The ESL students with higher self-esteem tended to ask questions and also volunteered answers both in individual and group interaction situations.

- Motivation: The ESL students with higher learning motivation or who finished given assignments/projects tended to interact more with others, to ask questions or to find out better ways of doing their assignments.

- Familiarity with the people around the student: The ESL students, especially those with lower English proficiency, tended to associate with the people they knew.

- English language (oral) proficiency: The ESL students with higher English proficiency tended to interact more with others. They appeared to have less anxiety about speaking English.

How Did the Students Interact With the Computers?

As a result of computer-integrated instruction, students increased interaction among themselves and with the teachers. The interaction of ESL students and the computer in MacMagic was particularly interesting. At the beginning of the school year in September, most of the ESL students were reluctant and frustrated using the computer, but within a week their interest grew. They quickly realized they had control over what they did. Even a student whose English proficiency level is low can write, draw, and produce a document which looks as good as anyone else's. The computers boosted the students' self-esteem. They could learn to do things on the computer all by themselves, sometimes before anyone else had. High language proficiency is not required in using the computer. A student with limited proficiency can teach and show others how to make a graphic or a HyperCard stack work. Contributing and teaching others gives a big boost to the student's self-esteem.

The students controlled their content as well as their work pace. They seemed to be comfortable having control over system parameters and their options to explore the computers' effects. By having computers in front of them, the students were able to compare their stacks to others, and to try each other's programmed stacks. Naturally, comments, questions and explanations were exchanged.

The Interaction Patterns of the ESL Students in MacMagic and ESL Classes

Do ESL students in MacMagic interact with the native speakers and the teachers more than ESL students in ELAC and Sheltered classes?

The ESL students in MacMagic interacted more with the native English speaking students and the teachers than their counterparts in other ELAC and Sheltered classes, perhaps because the ESL students in MacMagic had more access to native English speakers. Typically, in ELAC or Sheltered classes, the student population is predominately Spanish speaking, with few students from other native language backgrounds. The students tend to

speak in their native languages if they have the opportunity to do so. This was observed among the ESL students in MacMagic as well. They exhibited a clear tendency and preference for speaking their native language.

MacMagic has a low teacher-to-student ratio. The ELAC and Sheltered classes are made up of a larger number of students. Also, there are new students entering the class throughout the year. In some months, up to three new non-English speaking students are enrolled in an ESL class. The teacher-to-student ratio is higher in the regular ESL classes than in MacMagic.

Cooperative learning activities require interaction among students. The ESL classes that implemented this cooperative learning approach were quite successful, and resulted in student interaction. The classes which didn't use the cooperative approach did not have as much interaction. These classes also had more class management and behavior problems, and the better the students' English skills, the more they talked to others. The ESL students in MacMagic had a higher English proficiency in general.

Description of Interest/Participation in MacMagic and ESL Classes

Interest level ran relatively high among the MacMagic ESL students. This issue is related to the teachers' classroom management styles, the students' motivation level, and the organization of the class. However, based on the teaching strategies employed by the teachers, there were times when the ESL class students were more enthusiastic and interested in their learning process than the MacMagic students.

It's impossible to generalize about the differences between teaching styles in MacMagic and other ESL classes. There were seven teachers involved in the observations of five different classes with students who had varying language backgrounds and grade levels. Each teacher had her own personal style in the classroom.

ESL students in the MacMagic classes were given individual attention when necessary. Sixth grade MacMagic classes were more structured. They had more instruction sessions where the whole class came together and the teachers would lead the class in activities. ESL students covered the same subjects as English speaking students through class reading. The class was divided into two reading groups. One group was for the native English speaking students; the other was for students with lower reading ability. All but two in this group were ESL students. The groups went into two different rooms when they had reading group sessions. Typically, the class had to read a certain amount of pages in their reading book the night before, and a brief writing assignment was given. In the ESL reading group, the teacher would call on each student to read a section of the book aloud. The teacher helped students who had difficulty pronouncing some words and corrected mistakes. After a student finished reading a section, the teacher would go over the passage, making sure it was understood, explaining difficult words in context and in simpler language.

For example, when the class finished reading a section of a book called Golden Goblet, the teacher would explain what a 'goldsmith' is, and would ask what the main character did or what happened in the section. Most of the students participated in the discussions with enthusiasm. Interestingly, when the class wasn't divided, some ESL students never participated or volunteered answers to the teachers' questions. However, in their reading group, they got involved in the discussion and frequently volunteered answers. The level of participation and interaction increased visibly. This was especially obvious with the girls. One usually quiet, non-participatory Asian girl became more involved with her reading group, improving during the school year, interacting with others and eventually pursuing the teachers to ask questions. As the teachers realized her personal needs and gave her more individualized attention, she gained more self-confidence. Towards the end of the school year, she was frequently spotted speaking to other students, asking questions, commenting on others' computer work, showing her stacks, demonstrating some skills, and asking questions of the teachers.

The teachers in the sixth grade MacMagic class had a tendency to speak in an exaggerated manner, pronouncing their words slowly to make their speech clearer. The class was tightly managed, yet the students were free to move around and talk to others. The organization of the class was well planned in advance; this enabled the teachers to teach efficiently using cooperative learning strategies. Two sixth grade MacMagic teachers were often observed discussing their new class plans, implementing and adjusting as they went along. The ESL students were mostly "mainstreamed" in MacMagic, with access to the same content instruction, but were able to receive more individualized help from the teachers and from each other. Group discussions and activities encouraged help among the students. The groups were carefully organized by the teachers according to each member's ability, language background, and factors such as interaction and behavior patterns. They learned techniques for analyzing, interpreting, negotiating and communicating their information as a team. The noise level in the classroom was rather high when the students were engaged in group activities, but the students assumed a higher level of responsibility for learning.

The sixth graders interacted more freely across gender, ethnic and linguistic lines at the beginning of the school year. As time passed, even though the students were more familiar with each other, the gender distinction became more obvious. The casual interaction between Spanish speaking girls and boys became less frequent, except among those engaged in 'boyfriend-girlfriend' relationships. As the year progressed, the Spanish speaking boys became more aware of the importance of their Latino heritage. The Latino students were constantly struggling for their identity in the two sometimes confusing and conflicting cultures, namely the mainstream/school community and their family/neighborhood community. During interviews many ESL students stressed the importance of speaking Spanish and maintaining their cultural identity. However, at the same time, the students faced internal and external pressures to be assimilated into mainstream society. The Spanish speaking ESL students usually distinguished themselves as "Latinos," as opposed to "Americans." Mostly when faced with the dilemma, the Spanish speaking students, especially the boys, emphasized their Latino heritage by speaking Spanish.

Seventh grade MacMagic classes were different in terms of students' interactions and class organization, more relaxed with more student freedom. The seating arrangement in the MacMagic classroom changed several times throughout the school year. Because of the emphasis on cooperative learning the students were seated in groups all year long. Every activity in the class included at least some group work or cooperation among the students. The students were encouraged to help each other, consult, and critique each other's work. With the exception of two more advanced students, the ESL students were separated from the rest of the class for the "word bank" session, when they would go over words and grammar rules (mostly mechanics and punctuation). ESL students were assigned basic study words, in addition to the native speaker's pre-advanced vocabulary. The ESL group was tested separately on the "word bank" quiz day. The teachers gave individualized help to any student when it was needed. Frequently, the teachers helped ESL students to catch up after school.

The ELAC 2 and Sheltered classes were taught by three different teachers with different teaching styles. These ESL teachers had classes of 20 to 40 (depending on the class) students learning English as their second language. All ESL classes had some form of grammar instruction and vocabulary instruction sessions. Grammar and vocabulary studies are an important part of second language learning. In classrooms with many students, some speaking different native languages, such study can be difficult: many of the students don't know the basic rules of the language. After grammar and vocabulary instruction sessions, the students were given quizzes and assigned homework related to the lesson.

In order to provide grade level content instruction, teachers employed the strategies of "sheltered instruction," which involves using a variety of descriptions so the student will understand the content. The teachers explained the words and concepts in each lesson using pictures from books, overhead projector images and video tapes.

Some of the ESL classes also implemented cooperative learning groups, activities and projects. The students were seated in groups of four or five. These were very successful in terms of encouraging meaningful learning interactions. The students responded to the teachers' lessons with enthusiasm and interest. Helping each other and working together was part of their everyday class activities. The ESL classes not employing group work or cooperative approaches spent more time on student behavior problems. In these classes, the students sat in rows in the same seating arrangement throughout the school year. Typically, talk among students was discouraged. Getting together for in-class assignments was not the norm. Therefore, students exhibiting a tendency to work together was viewed as negative behavior.

Table 6.1 outlines the differences between MacMagic and ESL classes.

Table 6.1: Differences Between MacMagic and ESL Classes

	MacMagic	ESL classes
Teachers	2 in each class	1 in each class
I.A (Instructional Assistant)	0	1*
Other Resource	One full-time technical support person Student TAs	
Technology	Multimedia computer lab (with computers, laser printer, scanner, laserdisc player, computer screen projector, VCR, video camera ...)	Overhead projector 1 Mac Classic**
Students (number)	28 per class	20 to 40 per class
Language background	Mixed, a majority of native English speakers	All ESL
ESL Number	22-27 out of 112 (1-10 out of 28 to 30 students per class)	whole class
Class time	3 periods everyday	3 periods everyday - 6th ELAC class 3 periods everyday - 7th & 8th combination ELAC class 2 periods everyday - 7th Sheltered Core
	stayed together all year	received new students throughout the year
Organization	Cooperative learning (used extensively) -peer editing -peer instruction -group projects & presentations Individual assignments -reading -writing (with hand and word processed) -process writing using word processor -other works Content area instruction (CA framework-based) Individualized attention Portfolio assessment (process assessment) Technology facilitated Hands-on activities ESL students mainstreamed Relaxed, students walking around freely ESL students spoke their first language with other ESL students who spoke the same language	Cooperative learning (depends on the teacher) -group projects -group activities -hands-on activities (depends on the teacher) -group writing (depends on the teacher) Individualized assignments -reading -writing (hand written) -other works (vocabulary, grammar) Grammar, rules, usage, mechanics separately taught Individualized attention (when the teacher can offer it) Assessment (part portfolio and part test and quiz scores) Content area instruction (CA frame work) ESL students taught in sheltered language Whole language approach relaxed ESL students spoke their first language with other ESL students who spoke the same language

* 7th grade Sheltered class did not have an instructional assistant every day. This class only had an instructional assistant for 30 to 40 minutes three days a week.

** Not all non-MacMagic classes had a computer in the classrooms. 7th grade Sheltered class did not have a computer in the classroom.

Chapter VII

Findings from the Comparison of MacMagic Students to Regular ESL Students

Chapter VII: Findings from the Comparison of MacMagic Students to Regular ESL Students

In the following sections, we present the results of quantitative analyses designed to test several specific hypotheses. First, we look briefly at attendance figures. Then we present the results of several repeated-measures Analyses of Variance (ANOVAs) which test for differences between MacMagic and ESL control groups on an array of objective measures.

Comparison of the Absence Rates of the MacMagic and ESL Groups

The average days absent per student are presented in Table 7.1. As shown, the lowest absence rate occurred among sixth grade MacMagic students while the highest absence rate occurred among seventh grade ESL comparison students.

Table 7.1: Mean Absence Rates for MacMagic and ESL Students in 6th and 7th Grades

	6th	7th
MacMagic	3.286 n=7 sd=3.638	6.600 n=15 sd=6.620
ESL	5.111 n=9 sd=5.840	9.353 n=17 sd = 9.353

A 2 x 2 Analysis of Variance (ANOVA) was used to examine absence rates among ESL and MacMagic students in sixth and seventh grade. There was a nonsignificant trend toward fewer absences in sixth grade, compared to seventh grade, $F(1,44) = 2.86$, $p = .10$. As shown in Table 7.1, sixth graders averaged just over four absences, while seventh graders averaged just over eight absences. The difference between MacMagic students and ESL students did not approach statistical significance, $F(1,44) = 1.05$, $p = .31$, nor did the interaction between grade and condition, $F(1, 44) = .043$, $p = .83$.

The Relationship Between the Absence Rates and Language Proficiency Measures

In order to investigate the influence of the number of absences on various language proficiency scores, simple correlations were run between number of absences and all dependent measures, including pre-test scores, post-test scores, and change scores on each measure. Change scores were generated for each student on each measure by subtracting pre-test scores from post-test scores.

There was a clear relationship between the pre-test scores and the post-test scores: the higher the pre-test score, the higher the post-test score. However, the correlational analyses yielded no other significant results, suggesting that number of absences did not have any measurable relationship with students' initial ability levels, with their final ability levels, nor with their improvement on the variables examined in the current study.

Language Proficiency Scores

Table 7.2: Mean Pre-test and Post-test Language Proficiency Scores

	MacMagic	ESL
Pre-test	Mean = 416.364	Mean = 383.654
	n = 22	n = 26
	sd = 74.990	sd = 75.169
Post-test	Mean = 454.364	Mean = 420.846
	n = 22	n = 26
	sd = 59.390	sd = 54.782

A 2 x 2 ANOVA was used to examine changes in language proficiency scores for MacMagic and ESL students. Pre-test and post-test proficiency scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

There was a nonsignificant trend toward higher scores for MacMagic students, relative to ESL students, $F(1,46) = 3.18$, $p = .08$. As shown in Table 7.2, MacMagic students' scores were slightly higher at both pre-test and post-test.

There was a significant main effect for pre-test versus post-test, $F(1,46) = 50.24$, $p < .0001$. As would be expected, students' scores were significantly higher at the time of the post-test than at the time of the pre-test.

The interaction between condition (MacMagic versus ESL) and testing time (pre-test versus post-test) proved nonsignificant, $F(1,46) = .006$, $p = .67$, suggesting that there

was no difference between MacMagic and ESL students in language proficiency score improvement.

To summarize, both MacMagic students and ESL group students improved about equally over the course of the year.

Reading/Writing Total Scores

Table 7.3: Mean Pre-test and Post-test Reading/Writing Total Scores

	MacMagic	ESL
Pre-test	Mean = 128.864	Mean = 118.846
	n = 22	n = 26
	sd = 25.791	sd = 24.906
Post-test	Mean = 143.045	Mean = 135.231
	n = 22	n = 26
	sd = 21.217	sd = 22.201

Reading and writing scores were added for each student to yield a combined reading/writing score. A 2 x 2 ANOVA was used to examine changes in reading/writing scores for MacMagic and ESL students. Pre-test and post-test reading/writing scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

There was a nonsignificant trend toward higher scores for MacMagic students, relative to ESL students, $F(1,46) = 1.98$, $p = .17$. As shown in Table 7.3, MacMagic students' scores were slightly higher at both pre-test and post-test. There was a significant main effect for pre-test versus post-test, $F(1,46) = 35.95$, $p = .0001$. As would be expected, students' scores were significantly higher at the time of the post-test, than at the time of the pre-test.

The interaction between condition and testing time proved nonsignificant, $F(1,46) = .187$, $p = .67$, suggesting that there was no difference between MacMagic and ESL students in reading/writing score improvement.

Reading Scores

Table 7.4: Mean Pre-test and Post-test Reading Scores

	MacMagic	ESL
Pre-test	Mean = 68.636	Mean = 64.462
	n = 22	n = 26
	sd = 14.774	sd = 13.935
Post-test	Mean = 73.455	Mean = 70.615
	n = 22	n = 26
	sd = 14.774	sd = 16.337

A 2 x 2 ANOVA was used to examine changes in reading scores for MacMagic and ESL students. Pre-test and post-test reading scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

The main effect for condition did not approach significance, $F(1,46) = 0.78$, $p = .38$. As shown in Table 7.4, MacMagic students' scores were slightly but non-significantly higher than ESL students' at both pre-test and post-test.

There was a significant main effect for pre-test versus post-test, $F(1,46) = 8.69$, $p = .0051$. As would be expected, students' scores were significantly higher at the time of the post-test than at the time of the pre-test.

The interaction between condition and testing time proved nonsignificant, $F(1,46) = .129$, $p = .72$, suggesting that there was no difference between MacMagic and ESL students in reading score improvement.

Writing Scores

Table 7.5: Mean Pre-test and Post-test Writing Scores

	MacMagic	ESL
Pre-test	Mean = 60.227	Mean = 54.385
	n = 22	n = 26
	sd = 13.32	sd = 13.455
Post-test	Mean = 69.591	Mean = 64.615
	n = 22	n = 26
	sd = 10.051	sd = 8.6073

A 2 x 2 ANOVA was used to examine changes in writing scores for MacMagic and ESL students. Pre-test and post-test reading scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

There was a nonsignificant trend toward higher scores for MacMagic students, relative to ESL students, $F(1,46) = 3.438$, $p = .07$. As shown in Table 7.5, MacMagic students' scores were slightly higher at both pre-test and post-test.

There was a significant main effect for pre-test versus post-test, $F(1,46) = 36.36$, $p = .0001$. As would be expected, students' scores were significantly higher at the time of the post-test than at the time of the pre-test.

The interaction between condition and testing time proved nonsignificant, $F(1,46) = .071$, $p = .79$, suggesting that there was no difference between MacMagic and ESL students in writing score improvement.

Oral Total Scores

Table 7.6: Mean Pre-test and Post-test Oral Total Scores

	MacMagic	ESL
Pre-test	Mean = 72.955	Mean = 67.385
	n = 22	n = 26
	sd = 15.085	sd = 13.606
Post-test	Mean = 78.864	Mean = 71.423
	n = 22	n = 26
	sd = 13.130	sd = 10.871

A 2 x 2 ANOVA was used to examine changes in oral total scores for MacMagic and ESL students. Pre-test and post-test oral scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

There was a nonsignificant trend toward higher scores among MacMagic students, relative to ESL students, $F(1,46) = 3.16$, $p = .08$. As shown in Table 7.6, MacMagic students' scores were slightly higher at both pre-test and post-test.

There was a significant main effect for pre-test versus post-test, $F(1,46) = 21.01$, $p = .0001$. As would be expected, students' scores were significantly higher at the time of the post-test than at the time of the pre-test.

The interaction between condition and testing time proved nonsignificant, $F(1,46) = .745$, $p = .39$, suggesting that there was no difference between MacMagic and ESL students in oral score improvement.

Essay Scores

Table 7.7: Mean Pre-test Post-test Essay Scores

	MacMagic	ESL
Pre-test	Mean = 3.000	Mean = 2.692
	n = 22	n = 26
	sd = .690	sd = .679
Post-test	Mean = 3.523	Mean = 3.17
	n = 22	n = 26
	sd = .523	sd = .399

A 2 x 2 ANOVA was used to examine changes in essay scores for MacMagic and ESL students. Pre-test and post-test essay scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

There was a significant main effect for condition, $F(1,46) = 5.38$, $p = .02$. As can be seen in Table 7.7 MacMagic students' scores were significantly higher than ESL students' at both pre-test and post-test.

There was a significant main effect for pre-test versus post-test, $F(1,46) = 29.87$, $p = .0001$. As would be expected, students' scores were significantly higher at the time of the post-test than at the time of the pre-test.

The interaction between condition and testing time proved nonsignificant, $F(1,46) = .006$, $p = .67$, suggesting that there was no difference between MacMagic and ESL students in essay score improvement.

Essay Length

Table 7.8: Mean Pre-test and Post-test Essay Length

	MacMagic	ESL
Pre-test	Mean = 93.000	Mean = 73.115
	n = 22	n = 26
	sd = 48.694	sd = 38.883
Post-test	Mean = 125.227	Mean = 118.731
	n = 22	n = 26
	sd = 36.731	sd = 34.952

A 2 x 2 ANOVA was used to examine changes in essay length for MacMagic and ESL students. Pre-test and post-test essay length scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

The main effect for condition was not significant, $F(1,46) = 1.63$, $p = .21$. As shown in Table 7.8, MacMagic students' scores were slightly but non-significantly higher at both pre-test and post-test.

There was a significant main effect for pre-test versus post-test, $F(1,46) = 55.814$, $p < .0001$. As would be expected, students' scores were significantly higher at the time of the post-test than at the time of the pre-test.

The interaction between condition and testing time proved nonsignificant, $F(1,46) = 1.651$, $p = .21$, suggesting that there was no difference between MacMagic and ESL students in essay length change.

Oral Language Sample Scores

Table 7.9: Mean Pre-test and Post-test Oral Language Sample Scores

	MacMagic	ESL
Pre-test	Mean = 3.455	Mean = 3.077
	n = 22	n = 26
	sd = .963	sd = .744
Post-test	Mean = 3.886	Mean = 3.500
	n = 22	n = 26
	sd = .689	sd = .600

A 2 x 2 ANOVA was used to examine changes in oral language sample scores for MacMagic and ESL students. Pre-test and post-test essay length scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

There was a marginally significant main effect for condition, $F(1,46) = 3.79$, $p = .06$. As shown in Table 7.9, MacMagic students' scores were higher than ESL students' at both pre-test and post-test.

There was a significant main effect for pre-test versus post-test, $F(1,46) = 20.04$, $p = .0001$. As would be expected, students' scores were significantly higher at the time of the post-test than at the time of the pre-test.

The interaction between condition and testing time proved nonsignificant, $F(1,46) = 0.002$, $p = .96$, suggesting that there was no difference between MacMagic and ESL students in oral language sample score improvement.

Oral Language Sample Length

Table 10: Mean Pre-test and Post-test Oral Language Sample Length

	MacMagic	ESL
Pre-test	Mean = 107.091	Mean = 84.346
	n = 22	n = 26
	sd = 41.023	sd = 37.235
Post-test	Mean = 135.227	Mean = 122.615
	n = 22	n = 26
	sd = 36.487	sd = 32.629

A 2 x 2 ANOVA was used to examine changes in oral language sample length for MacMagic and ESL students. Pre-test and post-test essay length scores were a within subjects variable, while condition (MacMagic versus ESL) was a between subjects variable.

There was a nonsignificant trend toward higher scores by MacMagic students, relative to ESL students, $F(1,46) = 3.02$, $p = .09$. As shown in Table 7.10, MacMagic students' scores were slightly higher than ESL students' at both pre-test and post-test.

There was a significant main effect for pre-test versus post-test, $F(1,46) = 37.45$, $p = .0001$. As would be expected, students' scores were significantly higher at the time of the post-test than at the time of the pre-test.

The interaction between condition and testing time proved nonsignificant, $F(1,46) = 1.61$, $p = .21$, suggesting that there was no difference between MacMagic and ESL students in oral language sample length change.

Conclusions

The results presented in this chapter suggest the following conclusions:

- The results of the quantitative analyses suggest no differences between MacMagic students and ESL control students in improvement on the variables examined in the current study.

- It is worth noting that MacMagic and ESL students' initial ability levels were not perfectly matched: MacMagic students' scores were higher on most measures at the time of the pre-test, and they remained so at the time of the post-test. However, there were apparently no differential effects of the MacMagic and ESL programs.

- Had there been trends toward greater improvement among MacMagic (or ESL control) students, their higher initial scores might be cause for concern, as the so-called "ceiling effect" might lessen the degree of improvement possible among MacMagic students. However, the ceiling effect is probably not responsible for the lack of a program effect in the current study, given the lack of even a slight trend in the direction which would be predicted by such an effect.

- There were slightly fewer absences among sixth graders than among seventh graders. However, the difference between MacMagic students and ESL controls in number of absences did not approach significance. Surprisingly, numbers of absences weren't related to any of the performance measures examined in the current study.

Chapter VIII

Conclusion and Comments

Chapter VIII: Conclusion and Comments

Our year-long study on second language acquisition by ESL students in the MacMagic program leads to the following conclusions:

- The MacMagic group and the ESL group achieved about the same language growth in the 1992-'93 school year regardless of their core programs.
- The amount of social interaction between ESL students and native English speakers was higher in MacMagic.
- MacMagic facilitates English as a second language acquisition among ESL students as effectively as any other ESL classes such as ELAC or Sheltered classes which emphasize English language acquisition.
- In addition to English language acquisition, the students in MacMagic acquired additional computer skills, the ability to process abstract concepts, and socialization skills involved in the cooperative learning process, with computers as facilitative tools.

Acquisition of English as a second language involves many different variables, including attitude, motivation, aptitude, home situation, socialization, native language background, length of residence, and exposure to the target language environment. In this study, the variable examined was exposure to the MacMagic program. Classroom observations of student language interactions, interviews with students concerning MacMagic, and English language proficiency scores from the LAS (Language Assessment Scale) were the primary data sources for the investigation.

Results revealed that although ESL students did learn English in MacMagic, they did not acquire English significantly faster or with greater proficiency than ESL students in non-MacMagic classes. However, the English proficiency scores don't capture the total effect MacMagic had on the students. One must consider the process as well as the product. In this study, the observational and interview results suggested differences in the experiences of MacMagic and non-MacMagic students.

Students in MacMagic used three software packages to create their own work. Most wrote on the word processor and enhanced their writing with graphics. They also created their own HyperCard stacks. In order to create a HyperCard stack, students conducted research and organized information using associative thinking skills. We recommend that in future studies, researchers attempt to more objectively measure MacMagic's effect on

students' use of associative thinking skills, as well as MacMagic's effect on self-esteem, socialization skills and computer literacy. Even with their limited English proficiency, ESL students were able to participate in class activities and projects with other native English speakers. The teaching staff was especially accessible to ESL MacMagic students. The availability of an extra teacher, a computer technician, student teaching assistants, native speaking students and other ESL students, all contributed to the learning environment.

As noted, both classroom observation and interviews suggested that reaction to the MacMagic program was generally positive. Students felt in charge of their own learning and seemed to benefit from having teachers function as facilitators. Collaborative learning and process (portfolio) assessment also contributed to a positive and unique learning environment.

To better understand the effects of computer facilitated programs, further research should be done on the long-term benefits of MacMagic and similar programs on such aspects of learning as motivation, attitude, and socialization of the students. Innovative curricula as well technology-based instructional methods are among many possible second language learning schemes.

We conclude with a brief discussion of ways in which we think MacMagic can be improved.

Areas for Improvement

In general, classroom observations and student interviews have painted a positive picture of MacMagic. Students seemed to enjoy it, and the learning aspects were successful. Still, we would like to suggest several ways in which MacMagic, and similar programs, can be improved in the future.

- Strive to make the relationship between computer-based projects and the content area (e.g., language arts or social studies) as clear as possible. There were several instances in which students spent a great deal of time creating Hypercard stacks without using the experience to learn content-specific information.

- Strive to maximize the frequency of interaction between students of different languages and cultures. In spite of the opportunity for such cross-cultural communication, there was a tendency by students to seek out members of their own cultural or language background.

- Ensure that teachers are comfortable around computers and able to use them to their fullest extent.

- Increase student accountability. The relaxed, conversational atmosphere present in MacMagic allowed some students to "goof off."

Although most students used their freedom in a positive way, there were several who took advantage of the situation and did very little work.

- Explicitly address multi-cultural and multi-language-related issues to a greater degree in the curriculum, if possible. One suggestion would be to directly address cultural differences interactively, both in teacher training and in the curriculum.

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